


NERVE AGENT  CAS # RTECS # Counter Terrorism Card 0005	<p style="text-align: center;"><b>GF</b>  cyclohexyl sarin  cyclohexyl methylphosphonofluoridate  methylphosphonofluoridic acid, cyclohexyl  ester  Chemical Formula C<sub>7</sub>H<sub>14</sub>FO<sub>2</sub>P  Molecular mass: 180.15856</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;">  <b>chemical structure</b> </div>	
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	React with steam or water to produce toxic and corrosive vapors SEE NOTES:	Contain to prevent contamination to uncontrolled areas.	Water mist, fog, and foam, CO <sub>2</sub> . Avoid methods that will cause splashing or spreading.
<b>EXPLOSION</b>	Hydrogen may be produced by the corrosive vapors reacting with metals, concrete, etc.		
<b>EXPOSURE</b>	<ul style="list-style-type: none"> <li>⚠ <b>Lethal cholinesterase inhibitor in liquid or vapor form.</b></li> <li>⚠ <b>Potentially fatal at doses only slightly larger than those producing least effects.</b></li> <li>⚠ <b>Clothing releases agent for about 30 minutes after contact with vapor.</b></li> <li>⚠ <b>Contaminated surfaces present long-term contact hazard.</b></li> </ul>	<b>Do not breathe fumes.</b> <b>Skin contact must be avoided at all times.</b>	Seek medical attention <b>Immediately.</b>
<ul style="list-style-type: none"> <li>⚠ <b>INHALATION</b></li> </ul>	Symptoms may occur within minutes or hours, depending upon dose.  <b>Same sequence of symptoms despite the route of exposure:</b> MILD <ul style="list-style-type: none"> <li>⚠ runny nose</li> <li>⚠ tightness of the chest and breathing difficulty</li> <li>⚠ eye pain, dimness of vision and pin pointing of pupils (miosis)</li> <li>⚠ difficulty in breathing and cough</li> </ul> MODERATE <ul style="list-style-type: none"> <li>⚠ increased eye symptoms with blurred vision</li> <li>⚠ drooling and excessive sweating</li> <li>⚠ severe nasal congestion</li> </ul>	Hold breath until respiratory protective mask is donned.  Fire-fighting personnel should wear full protective clothing and respiratory protection during fire-fighting and rescue.  Positive pressure, full face piece, NIOSH-approved self-contained breathing apparatus (SCBA) will be worn.	<ul style="list-style-type: none"> <li>⚠ If severe signs, immediately administer, in rapid succession, all three Nerve Agent Antidote Kit(s), Mark I injectors (or atropine if directed by a physician).</li> <li>⚠ If signs and symptoms are progressing, use injectors at 5 to 20 minute intervals. (No more than 3 injections unless directed by medical personnel.)</li> <li>⚠ Maintain record of all injections given.</li> <li>⚠ Give artificial respiration if breathing has stopped. Use mouth-to-mouth when mask-bag or oxygen delivery systems not available. Do not use mouth-to-mouth if face is</li> </ul>

	<ul style="list-style-type: none"> <li>⌘ increased tightness of the chest and breathing difficulty</li> <li>⌘ nausea, vomiting, diarrhea, and cramps</li> <li>⌘ generalized weakness, twitching of large muscle groups</li> <li>⌘ headache, confusion, and drowsiness</li> </ul> <p style="text-align: center;"><b>SEVERE</b></p> <ul style="list-style-type: none"> <li>⌘ involuntary defecation and urination</li> <li>⌘ very copious secretions</li> <li>⌘ twitching, jerking, staggering and convulsions</li> <li>⌘ cessation of breathing, loss of consciousness, coma and death.</li> </ul>		<p>use mouth-to-mouth if face is contaminated.</p> <p>⌘ Administer oxygen if breathing is difficult.</p>
⌘ <b>SKIN</b>	<p>See Inhalation</p> <p>Pupil size may range from normal to moderately reduced.</p>	Protective Gloves: Butyl Rubber Glove M3 and M4 Norton, Chemical Protective Glove Set	Remove contaminated clothing and wash skin with large amounts of soap and water, 10% sodium carbonate solution, or 5% liquid household bleach. Rinse well with water. Administer nerve agent antidote kit only if local sweating and muscular twitching symptoms.
⌘ <b>EYES</b>	<p>See Inhalation</p> <p>Very rapid onset of symptoms.</p>	Chemical goggles and face shield.	Immediately flush eyes with water for 10-15 minutes, then don respiratory protective mask. Symptoms of only miosis does not warrant antidote injection.
⌘ <b>INGESTION</b>	<p>See Inhalation</p> <p>Pupil size may range from normal to moderately reduced.</p>		Do not induce vomiting. First symptoms are likely to be gastrointestinal. Immediately administer Nerve Agent Antidote Kit, Mark I.
<b>DECONTAMINATION</b>	<b>SPILLAGE DISPOSAL</b>	<b>PACKAGING &amp; LABELLING</b>	
<ul style="list-style-type: none"> <li>⌘ solids, powders and solutions containing various types of bleach (NaOCl or Ca (OCl)<sub>2</sub>)</li> <li>⌘ DS2 (2% NaOH, 70% diethylenetriamine, 28% ethylene glycol monomethyl ether)</li> <li>⌘ towelettes moistened with NaOH dissolved in water, phenol, ethanol, and ammonia</li> </ul>	Cover with vermiculite, diatomaceous earth, clay, fine sand, sponges, and paper or cloth towels. Treat with large amounts of aqueous sodium hydroxide solution (minimum 10 % by weight). Scoop decontaminated material and place in approved container. After sealing, decontaminate the exterior and label. All	<p>Proper Shipping Name: Toxic liquids, organic, n.o.s. DOT Hazard Class: 6.1, Packing Group I, Hazard Zone A DOT Label: Poison DOT Marking: Toxic liquids, organic, n.o.s. (Isopropyl methylphosphonofluoridate) UN 2810, Inhalation Hazard DOT Placard: Poison</p>	

	leaking containers will be over packed with sorbent (e.g. vermiculite) placed between the interior and exterior containers. Label and dispose according to regulations. Conduct general area monitoring. If aqueous sodium hydroxide is not available, use following in the order of preference: Decontaminating Agent (DS2), Sodium Carbonate, and Supertropical Bleach Slurry (STB).	NFPA 704 Signal:  Health - 4 Flammability - 1 Reactivity - 1 Special - 0
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 **NFPA Sign 4110**

I M P O R T A N T  D A T A	<b>PHYSICAL STATE; APPEARANCE:</b> Colorless liquid. Odorless in pure form.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by all routes.
	<b>PHYSICAL DANGERS:</b> Incompatibility with tin, magnesium, cadmium plated steel and some aluminum. Some reaction with copper, brass and lead.	<b>INHALATION RISK:</b> Usually liquid in normal state, but will volatilize if heated to form vapor or aerosol.
	<b>CHEMICAL DANGERS:</b> Undergoes hydrolysis by acidic, neutral, and basic mechanisms, all of which give fluoride and forming Hydrofluoric Acid (HF) under acidic conditions.	<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> GF, an organophosphorus compound, is a lethal cholinesterase inhibitor similar in action to Sarin.
	<b>OCCUPATIONAL EXPOSURE LIMITS (OELs):</b> TLV : none -- <a href="#">see SARIN</a> (0.0001 mg/m <sup>3</sup> -- military, not ACGIH)	<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Limited data suggest delayed neuropathy (postural sway, psychomotor performance). Miosis has been noted up to 62 days.
PHYSICAL PROPERTIES	melting point: °C boiling point: 92 °C at 10 mm Hg vapor pressure (20°C): unknown mm Hg density (20°C): 1.12 g /cm <sup>3</sup> volatility: unknown mg/m <sup>3</sup> at 25°C specific gravity: unknown at 25°C	aqueous solubility: unknown  estimated log K <sub>ow</sub> : unknown log K <sub>benzene-water</sub> : unknown flashpoint: unknown °F flammability: unknown
ENVIRONMENTAL DATA		
NOTES		
This information was primarily derived from SARIN ( <a href="#">see CTC 0003</a> )		
ADDITIONAL INFORMATION		
Trade Names and Other Synonyms:		

**IMPORTANT  
NOTICE:**

**GF (CTC: 0005)** Neither the CDC or NIOSH nor any person acting on behalf of the CDC or NIOSH is responsible for the use which might be made of this information. This card contains the collective views of these agencies and may not reflect in all cases all the detailed requirements in response to a terrorism event on the subject. The user should verify compliance of the cards with the relevant STATE or TERRITORY legislation before use. NIOSH, CDC 2000